# Switching to OCR from OCR B (Advancing Physics)

## Introduction

We are really excited about our GCE Physics A qualification. Whether taking on the AS or the full A Level, this fantastic course is a great qualification for those with an interest in the subject. Why choose Physics A?

- The 'Big Ideas' of Physics are covered
- The topics are selected and structured to underpin the knowledge and understanding needed for the next generation of physicists
- Physics A is enjoyable to teach and learn, giving students the essentials for physics-related higher education courses, as well as many transferable, marketable skills
- There are many opportunities for 'hands-on' practical, linking to our flexible practical assessment model
- The topics of physics are presented in a clear and logical linear order with practical, maths and contextual opportunities highlighted.

## Textbook comparison

We have not included a textbook comparison in this switching document as there are a number of textbooks available for each exam board's qualifications, and the order and organisation of content within these textbooks can vary. However, similarities in content across exam boards mean that it is possible to use any textbook for the core content of any board's qualifications. The specification can be used to identify relevant content, as well as that which is not required for a specific qualification. If you need further clarification on any specific content, you can email our Subject Advisor team at science@ocr.org.uk.

## Support from OCR

We offer a range of support to teachers of our qualifications. This includes:

 

- A dedicated Subject Advisor team, with teaching and assessment experience, available to answer your queries and support your delivery of our qualifications. You can contact us by email at science@ocr.org.uk or by phone on 01223 553998.
- Monthly newsletters highlighting new resources, CPD courses, and other news about our qualifications.
- An online scheme of work builder which helps you create a bespoke scheme of work using the extensive range of resources we have provided for each specification.
- A wide range of support materials, including handbooks covering practical and mathematical skills, delivery guides, lesson elements, practical activity suggestions, candidate exemplar resources, and more.
- Free access to ExamBuilder, our mock assessment service that allows you to create your own bespoke assessments.
- Termly regional Science Teacher Networks, giving you the opportunity to meet with other teachers and our Subject Advisors.
- CPD courses, including courses for teachers new to teaching our qualifications and courses on outcomes from previous examination series to help inform your teaching.
- You can also follow and interact with our Subject Advisors on Twitter (@ocr_science).

 

## Key similarities

| OCR Physics A | OCR Physics B |
|---|---|
| **Flexible practical** assessment allows you to select from our suggested activities or use your own preferred practical activities | |
| Practical skills take centre stage, detailed in full at the start of the specification in a separate module for **clarity** and prominence | |
| A section of **multiple choice questions** in the exams to allow breadth of coverage.<br>20 in total at AS and 30 at A level. | |
| All **28 maths skills** covered in our free maths skills handbook and further supported with online resources | |
| Content is **split into six teaching modules**: Modules 1 to 4 constitute the stand-alone AS Level qualification; Modules 1 to 6, combined with the Practical Endorsement, constitute the full A Level. | |

## Key differences

| OCR Physics A | OCR Physics B |
|---|---|
| Specification **based around detailed learning outcomes** | Specification **based around key ideas and applications of physics** |
| The full A level is terminally assessed by three exam papers. There are **no inserts in the examinations**. | The full A level is terminally assessed by three exam papers; **one of the examinations contains an insert**. See the 'assessment' section of this document for more details. |

 

## Content

The content within the OCR Physics A specification covers the 'Big Ideas' of physics and will be very familiar. We've laid it out to support the co-teaching of the AS and A level and provide a logical linear progression through the A level.

| OCR Physics A | OCR Physics B |
|---|---|
| **Module 1: Practical skills**<br>Planning, implementing, analysis and evaluation<br>Plus all the skills to be covered in the Practical Endorsement | **Module 1: Practical skills**<br>Planning, implementing, analysis and evaluation<br>Plus all the skills to be covered in the Practical Endorsement |
| **Module 2: Foundations of physics**<br>• Physical quantities<br>• S.I. units<br>• Measurements and uncertainties<br>• Scalars and vectors | **Module 2: Fundamental data analysis**<br>• Physical quantities<br>• S.I. units<br>• Measurements and uncertainties<br>• Graphical representation of data<br><br>**Module 4: Waves and quantum behaviour**<br>• Vectors |
| **Module 3: Forces and motion**<br>• Kinematics and dynamics<br>• Linear motion<br>• Projectile motion<br>• Motion with non-uniform acceleration<br>• Equilibrium<br>• Density [and pressure]<br>• Work, energy and power<br>• Springs<br>• Mechanical properties of materials | **Module 3: Physics in action**<br>• Behaviour of materials<br>• Mechanical properties of materials<br>• Young modulus<br>• Force and extension<br>• Hooke's law<br><br>**Module 4: Waves and quantum behaviour**<br>• Space, time and motion<br>• Trajectories |

 

| OCR Physics A | OCR Physics B |
|---|---|
| • Newton's laws of motion<br>• Momentum | • Independent effect of perpendicular forces<br>• Work done<br>• Force, energy and power<br>• Displacement, velocity and acceleration<br>• Momentum |
| **Module 4: Electrons, waves and photons**<br>• Charge and current<br>• E.m.f. and p.d.<br>• Resistivity and resistance<br>• Power<br>• Series and parallel circuits<br>• Internal resistance<br>• Potential dividers<br>• Wave motion<br>• Electromagnetic waves<br>• Superposition<br>• Stationary waves<br>• Quantum physics<br>• Photons<br>• The photoelectric effect<br>• Wave particle duality | **Module 3: Physics in action**<br>• Sensors<br>• Resistance [ and conductance]<br>• Potential dividers<br>• Ohmic and non-ohmic devices<br>• Resistivity [ and conductivity]<br>• Conservation of charge and energy<br>• Electrical circuits<br>• Diagrams of wave-fronts and rays<br>• Polarisation of e-m waves<br>• Particle size and spacing<br>•<br>**Module 4: Waves and quantum behaviour**<br>• Standing waves<br>• Interference, refraction and diffraction<br>• Photons and quantum behaviour<br>• Electron diffraction<br>• Gravitational potential energy<br>Modelling changes |
| **Module 5: Newtonian world and astrophysics**<br>• Temperature<br>• Solid, liquid and gas<br>• Thermal properties of materials<br>• Ideal gases | **Module 4: Waves and quantum behaviour**<br>• Gravitational potential energy<br><br>**Module 5: Rise and fall of the clockwork universe**<br>• Matter very simple |

 

| OCR Physics A | OCR Physics B |
|---|---|
| • Circular motion<br>• Centripetal force<br>• Simple harmonic oscillations<br>• Energy of a simple harmonic oscillator<br>• Damping<br>• Point and spherical masses<br>• Newton's law of gravitation<br>• Planetary motion<br>• Gravitational potential and energy<br>• Stars<br>• Electromagnetic radiation from stars<br>• Cosmology | • Specific thermal capacity<br>• Ideal gases<br>• Impulse<br>• Kinetic theory of gases<br>• Relationships between *p, V, N* and *T*<br>• Matter: hot or cold<br>• Simple harmonic motion<br>• Free and forced oscillations<br>• Damping<br>• Out into space<br>• Gravitational and kinetic energy<br>• Motion in a uniform gravitational field<br>• Gravitational field and potential of a point mass<br>• Angular velocity<br>• Circular motion, horizontal and in an orbit<br>• Newton's law of gravitation<br>• Our place in the universe<br>• Radar type measurements<br>• Evidence for the hot big bang<br>• Logarithmic scales<br>• Distances, ages and relative velocities of astronomical objects |
| **Module 6: Particles and medical physics**<br>• Capacitors<br>• Energy stored by a capacitor<br>• Charging and discharging capacitors<br>• Point and spherical charges<br>• Coulomb's law<br>• Uniform electric field<br>• Electric potential energy | **Module 5: Rise and fall of the clockwork universe**<br>• Capacitance<br>• Time constant<br>• Exponential decay<br>• Radioactive decay<br>• Activity and half-life |

 

| OCR Physics A | OCR Physics B |
|---|---|
| • Magnetic fields<br>• Motion of charged particles<br>• Electromagnetism<br>• The nuclear atom<br>• Fundamental particles<br>• Radioactivity<br>• Nuclear fission and fusion<br>• Using X rays<br>• Diagnostic methods in medicine<br>• Using ultrasound | **Module 6: Field and particle physics**<br>• Coulomb's law<br>• Charge and field<br>• Uniform electric field<br>• Inverse square law<br>• Electric potential energy<br>• Motion of charged particles in a magnetic field<br>• Comparison of field types<br>• The electronvolt<br>• Magnetic field strength<br>• Flux<br>• Electromagnetism<br>• Transformer action<br>• Action of a dynamo<br>• Electromagnetic forces<br>• Magnetic circuits<br>• Fundamental particles<br>• Particle accelerators<br>• Evidence from scattering<br>• Energy levels within the atom<br>• A simple atomic model<br>• Quark structures<br>• Conservation of mass/energy, charge and lepton number<br>• Balanced nuclear equations<br>• Ionising radiation [and risk]<br>• Penetrating power<br>• Stability and decay in terms of binding energy<br>• Nuclear fission and power generation<br>• Energy changes from nuclear transformations |

 

| OCR Physics A | OCR Physics B |
|---|---|
| **Appendix 5f: Mathematical requirements**<br>Arithmetic and numerical computation<br>• Handling data<br>• Algebra<br>• Graphs<br>• Geometry and trigonometry | **Appendix 5f: Mathematical requirements**<br>• Arithmetic and numerical computation<br>• Handling data<br>• Algebra<br>• Graphs<br>Geometry and trigonometry |

**Content in OCR Physics B but not in OCR Physics A:**

**Module 3: Physics in action**

- Communication
- Images
- Lenses
- Digital signals
- Sampling techniques
- Data transmission

**Module 5: Rise and fall of the clockwork universe**

- Creating models

**Module 5: Rise and fall of the clockwork universe**

- Boltzmann factor
- Ratios of numbers of particles in quantum states
- Qualitative effects of temperature in processes with activation energy
- The relativistic principle
- Relativistic calculations

**Module 6: Field and particle physics**

- Effects of ionising radiations on tissue
- Absorbed and effective doses

 

## Assessment

| OCR Physics A | OCR Physics B |
|---|---|
| **AS Paper 1: Breadth in Physics, Modules 1-4** 50% of AS<br>Written paper 1hr 30 minutes<br>70 marks<br><br>Section A multiple choice questions, 20 marks. Section B short structured questions, covering problem solving, calculations, practical and theory, 50 marks. | **AS Paper 1: Foundations of Physics, Modules 1-4**<br>50% of AS<br>Written paper 1hr 30 minutes, 70 marks<br><br>Section A multiple choice questions, 20 marks. Section B Structured questions, covering problem solving, calculations, practical and theory, 50 marks. |
| **AS Paper 2: Depth in Physics, Modules 1-4** 50% of AS<br>Written paper 1hr 30 minutes<br>70 marks<br><br>Short structured questions and extended response questions, problem solving, calculations, practical and theory. | **AS Paper 2: Physics in Depth, Modules 1-4**<br>50% of AS<br>Written paper 1hr 30 minutes, 70 marks<br><br>Short structured questions and extended response questions covering problem solving, calculations, practical and theory. |
| **A Level Paper 1: Modelling Physics, Modules 1, 2, 3 & 5**<br>37% of A level<br>Written paper 2 hours 15 minutes<br>100 marks<br>Section A multiple choice questions, 15 marks. Section B short structured questions, and extended response questions, problem solving, calculations, practical and theory 85 marks. | **A Level Paper 1: Fundamentals of physics**<br>**Modules 1-6**<br>41% of A level<br>Written paper 2 hours 15 minutes<br>110 marks<br><br>Section A multiple choice questions, 30 marks. Section B Structured questions covering theory and practical skills. |

 

| OCR Physics A | OCR Physics B |
|---|---|
| **A Level Paper 2: Exploring Physics, Modules 1, 2, 4 & 6**<br>37% of A level<br>Written paper 2 hours 15 minutes<br>100 marks<br><br>Section A multiple choice questions, 15 marks. Section B short structured questions and extended response questions, problem solving, calculations, practical and theory 85 marks. | **A Level Paper 2: Scientific literacy in physics**<br>**Modules 1-6**<br>37% of A level<br>Written paper 2 hours 15 minutes<br>100 marks<br><br>Structured questions and extended response questions covering theory and practical skills. The paper includes questions on an Advance Notice article for candidates to apply their knowledge to new and exciting contexts in Physics |
| **A Level Paper 3: Unified Physics, Modules 1-6** 26% of A level<br>Written paper 1 hour 30 minutes<br>70 marks<br><br>Short structured questions and extended response questions, problem solving, calculations, practical and theory. | **A Level Paper 3: Practical skills in physics**<br>**Modules 1-6**<br><br>22% of A level<br>Written paper 1 hour 30 minutes, 60 marks<br><br>Structured questions, problem solving, calculations, and extended response questions with a focus on the assessment of theory and practical skills within practical contexts |

 

## Want to switch to OCR A?

If you're an OCR-approved centre, all you need to do is download the specification and start teaching.

Your exams officer can complete an expression of interest form which enables us to provide appropriate support to them. When you're ready to enter your students, you just need to speak to your exams officer to:

1. Make estimated entries by 10 October so we can send you any early release materials, prepare the question papers and ensure we've got enough examiners.
2. Make final entries by 21 February

If you are not already an OCR-approved centre please refer your exams officer to the centre approval section of our admin guide.

**Practical Endorsement Administration (A Level only)**

The requirements for the practical endorsement have been set by the Department for Education and Ofqual working with all awarding bodies to ensure a common approach.

Just as when following the OCR A Level Physics B qualification, your A Level students studying OCR Physics A will need to demonstrate to you, their teacher(s), that they are consistently and routinely competent in each of the skills and techniques defined for A Level Physicists.

You will need to:

- Keep records of carrying out practical activities as well as your assessment of competence of each of your students in each of these skills and techniques. This can be done, if you wish, using our OCR tracker spreadsheet, available in both fixed format and new flexible format, editable version.

- Designate a 'Lead Teacher' who will need to make sure that they have completed the online Lead Teacher training
- Email us at science@ocr.org.uk to let us know you've started teaching the qualification. This will make sure we have up-to-date information on your centre for planning monitoring visits. When a monitoring visit takes place at your centre for Physics it will be carried out by an OCR-appointed monitor applying the criteria

 

agreed across all awarding organisations. Up-to-date details on the monitoring process are available on the Positive about practical page.

Students need to keep records of their practical work, which can be done in whatever format best suits you and your students, be it a lab book, a loose leaf folder or an electronic record.

Help and guidance are available from our Positive about practical page.

## Next steps

1. Familiarise yourself with the specification, sample assessment materials and teaching resources on the OCR Physics A qualification page of the OCR website.
2. Browse the online delivery guides for teaching ideas and use the Scheme of Work builder to create your personal scheme of work.
3. Get a login for our secure extranet, Interchange – allows you to access the latest past/practice papers and use our results analysis service, Active Results.
4. Sign up to receive subject updates by email.
5. Sign up to attend a training event or take part in webinars on specific topics running throughout the year and or our Q&A webinar sessions every half term.
6. Attend one of our free teacher network events that are run in each region every term. These are hosted at the end of the school day in a school or college near you, with teachers sharing best practice and subject advisors on hand to lead discussion and answer questions.
7. Follow us on Twitter (@ocr_science) where you can have discussions with other teachers and OCR Subject Advisors, and where new resources are developed and posted first.

 